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PREDICTION OF FINANCIAL DISTRESS CONDITIONS ON MANUFACTURING COMPANIES LISTED IN INDONESIAN STOCK EXCHANGE

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ABSTRACT

When a company experiences financial problems that drag on, it will cause failure. This research is to find out whether financial ratios (current assets, return on assets, total assets turnover, debt to total assets) can predict financial distress in mining companies listed on the Indonesian derivatives exchange. Also are there differences in performance between companies developing. This study uses 17 samples that meet the criteria. The analysis method used is discriminant and Anova analysis. The results obtained that all variables can predict financial distress, but only return on asset variables that can form discriminant functions in predicting financial distress in mining companies. On the other hand, the performance of the mining company is significantly different in the ratio of return on assets.
Keywords: *Financial Distress, Financial Ratio, Discriminant Analysis.*

INTRODUCTION

When a company experiences financial difficulties, it will be a consideration for investors and creditors not to invest. Thus, a good company and investors who want to be targeted must show healthy financial performance. Problems of financial difficulties faced by a company if allowed to drag on will result in bankruptcy.

Financial distress is a condition where total debt exceeds the total assets. *Financial distress* starts from the inability to fulfill its obligations, especially short-term obligations including liquidity obligations, and also includes long-term liabilities included in the obligation of solvency. Early warning system (early warning system) to anticipate the existence of financial distress needs to be developed, because by knowing a condition of financial distress from an early stage it is expected that an action can be taken to anticipate possible bankruptcy.

Platt and Platt in Almilia (2004) state the usefulness of information if a company experiences *financial distress* is:

1. Can accelerate management actions to prevent problems before the occurrence of bankruptcy in the future.
2. The management can take action to merge or take over so that the company is better able to pay debts and manage the company properly.
3. Provide early warning signs of bankruptcy.

Based on the above explanation, then with the information provided early on about the existence of financial distress conditions will avoid a company avoiding bankruptcy. Therefore, it is necessary to develop a prediction model for each industry group and perhaps even an industry sub-group as an early warning for companies facing financial difficulties.

Mining companies are industrial companies that also require huge capital in exploring natural resources in developing mining. For this reason, many mining companies enter the capital market to absorb investment from investors or potential investors in strengthening their financial position.

Research on financial ratio analysis in predicting *financial distress* has been carried out. Among them Luciana Spica & Kristijadi (2003) in their research stated that of the twelve variables in the regression equation showed that financial ratios can be used in predicting financial distress in a company. Kusumawardana (2013) shows that the debt ratio, return on assets, and sales growth are ratios that can be used to predict financial distress in LQ45 companies listed on the IDX. Pane Ayuningtyas (2015) also stated that, financial ratios can predict financial distress in companies, the most dominant ratio is proven to be significant to distinguish which companies are bankrupt and not bankrupt is Net Working Capital, current ratio, quick ratio, return on assets.

The phenomenon of the importance of the information described above, especially for potential investors, as well as the number of studies that use different variables in predicting financial distress, this study also wants to contribute to financial distress prediction models in mining sub-sector manufacturing companies.

There are several things that become the urgency of this research, namely companies should be able to predict the occurrence of financial distress, one of them is by interpreting or analyzing finances through the financial statements

presented and to find out the financial situation and development from year to year, this is done so the company will survive and avoid bankruptcy. In addition, financial statements are a means of communicating financial information to interested parties, especially for investors and potential investors. This is achieved by analyzing financial statements. The analysis that is often used in making these predictions is in the form of financial ratios.

For this reason, the company needs to know, analyze and predict financial distress in mining companies listed on the Stock Exchange using Current Ratio, Return On Assets, Total Asset Turnover, Debt to Total Assets; to determine the dominant variables between Current Ratio, Return On Assets, Total Asset Turn Over, Debt to Total Assets in predicting financial distress in mining companies listed on the IDX; and to analyze the differences in financial performance between mining companies in Indonesia.

LITERATURE REVIEW

Financial statements are information that describes the condition of a company, which will be an information that describes the performance of a company (Irham Fahmi, 2014: 22). Published financial statements are considered important in decision making, this statement is confirmed by Lev and Thiagarajan in Irham (2014: 23). Kasmir (2016) argues that, the financial statements themselves aim to provide financial information for a company, both at certain times and in certain periods. Financial reports can also be arranged suddenly according to the needs of the company or periodically. Clearly the financial statements are able to provide financial information to internal and external parties that have an interest in the company.

So that those who need it will be able to obtain the financial statements and help them especially in the decision-making process in accordance with what is expected.

S. Munawir in Mulyawan (2015: 100), states that financial statement analysis is a review of the relationship and tendency or tendency to determine the financial position and results of operations and the development of the company concerned. Conducting interpretation or analysis of a company's financial statements is very useful for analysts to find out the state of financial development of the company concerned.

According to James C. Van Horne in Kasmir (2016) financial ratios are indices that connect two accounting numbers and are obtained by dividing one number by another. Financial ratios are used to evaluate financial conditions and company performance. From the results of this financial ratio, it will be seen the health condition of the company concerned.

According to Mulyawan (2015: 113) the ratio is a picture of the company's situation at a certain time so that it can be known the trends (trends) of the company in the future by looking at the conditions in the past. The definition of financial ratios is the number obtained from the comparison of a financial statement with other posts that have a relevant relationship.

To measure the company's financial performance by using financial ratios, it can be done with several financial ratios. Every financial ratio has a specific purpose, purpose and meaning. Then, every result of the measured ratio is interpreted so that it becomes meaningful for decision making.

According to James C van Horne in Kasmir (2016) the type of ratio is divided as follows:

1. Liquidity Ratio
   a. Current Ratio
   b. Very Current Ratio (Quick Ratio / Acid Test Ratio)
2. Leverage Ratio
   a. Total debt toequity
   b. totaldebt to total assets
3. Activity Ratio
   a. (receivable turn over)
   b. Average collection period
   c. Inventory turnover (inventory turn over)
   d. Total asset turnover
4. (Profitability Ratio)
   a. Margin net profit
   b. Investment return
   c. Return on equity

According to the Plate and Plate in Irham Fahmi (2014: 9) *financial distress* as a stage of decreasing financial conditions that occur before bankruptcy or liquidation. *Financial distress* starts from the ability to fulfill its obligations, especially short-term obligations including liquidity obligations and also includes liabilities in the solvency category. *Financial distress* occurs before bankruptcy, therefore financial distress can become the company's "early warning" system as a sign of a problem. Companies that experience a lot of debt will experience *financial distress* earlier.

Bankruptcy itself is usually interpreted as a situation or situation where the company fails or is no longer able to fulfill the obligations of the debtor because the company experiences a lack or insufficiency of funds to run or continue its business. A company experiences financial distress if one of the following events occurs: experiences a negative net operating profit for several years or has an interest coverage ratio (ratio of operating income to interest expense) less than 1 (one) or has negative EPS for several years or termination of payment dividends, financial restructuring or mass layoffs.

When viewed from the financial aspect, there are three conditions that cause *financial distress*, namely:

1. Factors of capital insufficiency or lack of capital.
2. The amount of debt and interest.
3. Suffering losses.

The three aspects above are interrelated, therefore the balance must be maintained so that the company can avoid *financial distress* that leads to bankruptcy.

Based on the problems discussed earlier with some support from previous theories and studies according to Budiarti (2010) which states that the TATO variable can predict financial distress and according to Salina Mavianis

(2017) states that the CR, ROA, DAR variables can predict financial distress. For this reason, the hypothesis in this study, which is a temporary answer that has not been proven true, is as follows:

Allegedly Current Ratio, Return On Assets, Total Asset Turnover, Debt to Total Asset Ratio can predict financial distress in mining companies listed on the IDX.

It is assumed that Return On Assets is the most dominant in predicting financial distress in mining companies listed on the IDX.

It is suspected that there are significant differences between the performance of mining companies listed on the Indonesian stock exchange.

RESEARCH METHODS

This study was conducted on 17 mining companies listed on the Indonesia Stock Exchange and those that met the criteria that had been set. These companies include:
1. Adaro Energy Tbk (ADRO); 2. Bayan Resources Tbk (BYAN); 3. Delta Dunia Makmur Tbk (DOID); 4. Golden Energy Mines Tbk (GEMS); 5. Harum Energy Tbk (HRUM); 6. Indo Tambangraya Megah Tbk (ITMG); 7. Resources Alam Indonesia Tbk (KKGI); 8. Samindo Resources Tbk (MYOH); 9. Perdana Karya Perkasa Tbk (PKPK); 10. Golden Eagle Energy Tbk (SMMT); 11. Toba Bara Sejahtera Tbk (TOBA); 12. Ratu Prabu Energi Tbk (ARTI); 13. Elnusa Tbk (ELSA); 14. Radiant Utama Interinsco Tbk (RUIS); 15. Vale Indonesia Tbk (INCO); 16. J Resources Asia Pasifik Tbk (PSAB); 17. Citatah Tbk (CTTH)

In collecting data, several methods are needed so that accurate and appropriate data can be obtained. The methods include using the Documentation and Library Study method. While to analyze the data used two main methods, namely Discriminant Analysis by developing Z Score equations and different tests using one way and two way Anova.

Discriminant analysis has a purpose to predict the occurrence of the dependent variable with the input of independent variables and for the ability to choose which independent variables significantly affect the dependent variable and which are not (Singgih Santoso, 2017: 152). A special feature of discriminant analysis is the necessity of the dependent variable in the category type, while the independent variable is the ratio type. The discriminant model is developed, as follows:

$Zscore = B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$

Where:

X_1 Current Ratio; X_2 Returns On Assets; X_3 Total Turnover Assets; and X_4 Debt to Total Assets. Whereas B_{1-4} is Standardized Canonical Discriminant Coefficients.

The second method used a different test one way and two way ANOVA to determine which variables were distinguishing between mining companies and which variables differentiated companies in the category of *financial distress* and *non financial distress*.

RESEARCH RESULTS AND DISCUSSION

In this study researchers used secondary data obtained from financial statements that have been published on the official website of the Indonesia Stock Exchange (www.idx.co.id). A sample of 17 Mining companies was obtained.

Average Group Similarity

Test This test uses two ways, namely Wilk's Lambda and significant values in the F test. Wilk's lambda value ranges from 0 to 1. If the number approaches 0 then the data for each group is different, whereas if the number approaches 1 then the data for each group tends same. Following are the results of the group average test similarity.

Table 1 Test of Equality of Group Means

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
CR		0,954			
DAR		0,627			
TATO		0,871			
ROA		0,894			
		3,999			
		49,479			
		12,344			
		9,889			

Based on the table above shows that Wilks's lambda value for the variable CR, TATO and DAR approaching one (> 0.85), p This shows that these variables cannot explain the differences between the two groups, it is also strengthened by the significance value approaching the value of $\alpha = 0.05$. Whereas for the variable ROA the value of wilks' lambda is slightly above 0.5 this can be said to be the distinguishing variable between the two groups of financial distress and non financial distress. Thus it can be concluded that the hypothesis I in this study stating "Alleged Current Ratio, Return On Assets, Total Asset Turnover, Debt to Total Assets can predict financial distress in mining companies listed on the IDX" is not proven.

Table 2. Multicollinearity Analysis of

Pooled Within-Groups Matrices[a]

		CR	ROA	TATO	DAR
Covariance	CR	1,674	, 004	- 104	-, 168
	ROA	, 004	, 005	, 018	-, 003
	TATO	-, 104	, 018	, 256	, 007
	DAR	-, 168	-, 003	, 007	, 044
Correlation	CR	1,000	, 050	-, 159	-, 621
	ROA	, 050	1,000	, 529	-, 183
	TATO	-, 159	, 529	1,000	, 064
	DAR	-, 621	-, 183	, 064	1,000

a. The covariance matrix has 83 degrees of freedom.

Significant test here uses stepwise method to find the best variables. The following are the results of a significant test:

Table 4.2 Group Statistics

Group Statistics

Y		Mean	Std.Deviation	ValidN (listwise)	
				weighted	Weighted
0	CR	2.17	1,214	69	69,000
	ROA	.06	.063	69	69,000
	TATO	.88	.388	69	69,000
	DAR	.44	.204	69	69,000
1	CR	1.45	1,606	16	16,000
	ROA	-.07	.089	16	16,000
	TATO	.39	.327	16	16,000
	DAR	.62	.230	16	16,000
Total	CR	2:04	1,317	85	85,000
	ROA	.04	.086	85	85,000
	TATO	.79	.539	85	85,000
	DAR	.47	.220	85	85,000

The above table contains an explanation in the form of statistical data (descriptive) the main, namely the average and standard deviation of the two groups in this study. Which is 0 is a group of Non Financial Distress and 1 group of Financial Distress All of the above variables have an average number and a different standard deviation for the two groups. And everything will be tested to find out which variables have significant differences.

In the group statistics table, there are 69 samples classified as healthy companies and 16 samples of unhealthy companies. Of all variables filled with numbers 69 and 16, in this case there is no missing data. So for a total of all variables there are 85 pieces.

Table 4.3 Variables Entered / Removed Variable

Step	Entered	Min. D Squared					
			Between Groups	Exact F			
				Statistic	df1	df2	Sig.
1	ROA		0 and 1	49,479	1	83,000	5,241 E-10

At each step, the variable that maximizes the Mahalanobis distance between the two closest groups is entered.

The table above is an independent variable that can be entered (entered) in the discriminant equation among the four other variables which have a significant value <0.05. Thus, from the four variables there is only one variable that is significant and can influence or predict mining companies if they experience financial distress, namely the variable ROA (Return on Assets).

H2: Suspected Return On Assets are the most dominant in predicting financial distress conditions, namely in mining companies listed on the IDX.

Hypothesis 2 in this study is accepted, because the variable ROA (Return On Asset) can predict financial distress with discriminant analysis at mining companies on the Stock Exchange in 2012-2016.

Discriminant Model Accuracy Test The

accuracy test here is measured using Eigenvalues and Wilk's Lambda. With the following results:

Table 4.4 Eigenvalue

Function	Eigenvalue	% of Variance	Cumulative%	Canonical Correlation
1	0.644a	100.0	100.0	0.626

With Canonical Correlation value of 0.626 if squared (CR^2) to 0.392 or 39.2% means that the variation between groups bankrupt and not bankrupt explained by the independent variable consisting of Return on Assets, Total Assets Turnover, Debt to Total Assets, and Current Ratio of 39.2%. While the remaining 60.8% is explained by other variables.

The canonical correlation value shows the relationship between discriminant values with groups. A value of 0.626 means that the relationship is high because it is close to 1 (the magnitude of the correlation between 0-1)

Table 4.5 Wilk's Lambda

Test of Function (s)	Wilks' Lambda	Chi-square	df	Sig.
1,	608	40.276	4,	000

Obtained Wilk's lambda value of 0.606 with significant value 0.000 (<0.05), which means there are significant differences between the groups go bankrupt and not bankrupt based on four independent variables. Whereas chi-square has a value of 40.276 with a high level of significance showing a clear difference between the two groups.

Table 4.6Matrix

StructureStructure Matrix

	Function
	1
ROA	0.962
TATO	0.480
DAR	-0.430
CR	0.273

Structure matrix table describes the correlation between the independent variables and the discriminant function that is formed. It can be seen that the ROA variable is most closely related to the discriminant function.

Discriminant Analysis Functions

Table 4.7 Standardized Cononical Function Coefficients

Canonical Discriminant Function Coefficients

	Function
	1

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CR	0.111
ROA	0.903
TATO	0.033
DAR	-0.199

Discriminant function formed based on the table above:
Z Score = 0.111CR + 0.903 ROA + 0.033 TATO - 0.199 DAR

This function can used to predict a company is said to be in a state of financial distress or non financial distress. The clear separation of the two groups can be seen in the values of the following centroids:

Functions at Group Centroids

Z	Function
	1
0,00	0,382
1,00	-1,647

Cut Off

Points The cut off point is used to classify the company based on the value obtained. The cut off point is determined from the centroids group. With the following results.

Table 4.8 Prior probabilities for Group

Prior probabilities for Groups

Y	Prior	Cases Used in Analysis	
		Unweighted	Weighted
0,5000,500		69	69,000
1	0	16	16,000
Total	1,000	85	85,000

The table above explains that there are 85 compositions in this study, the discriminant model 69 samples in the group of non financial distress (0) and the remaining 16 are in the group of financial distress (1).

Table 4.9 Function at GroupCentroid

Functions at Group centroids

Y	Function
	1
0	.367
1	-1584

unstandardized canonical discriminant functions evaluated at group means

Classification Result

After discriminant function is made, then the classification is done. By looking at whether the classification is correct. Or what percentage of misclassification occurs in the classification process. The following is the result of the Classification Result.

Table 4.10 Classification Resultsa Result Classification, C

Classification Results[a]

		Z	Predicted Group Membership		In
			total,00	of 1.00	
Original	Count,	00	69	0	69
		1.00	9	7	
	16%,	00	100,0,	0	100,0
		1,00	56, 3	43.8	100.0

a. 89.4% of the original grouped cases were correctly classified.

In the original section, it can be seen that the initial data is classified as non financial distress from the classification of the fixed discriminant function in the group not bankrupt as many as 69 companies or 100.0%, meanwhile, there are 7 companies or 43.75% remain in thegroup *financial distress*, and 9 companies or 56.25% move togroups *non financial distress*.

Thus, the prediction accuracy in the discriminant model is 89.4%. The accuracy rate can be high, because it is close to 100%, it can be concluded that the above discriminant model can be used to predict *financial distress*. It can also be used as an interpretation of the various tables that exist (all of the above discussion) valid for use. The discriminant function can be used to predict *financial distress* and non- *financial distress* in this type of research classification, especially in Mining companies.

Interpretation of Research Results

From the results of the research and analysis of the results that have been explained in the previous description, then it will further elaborate based on the predetermined hypothesis.

In accordance with the proof of the hypothesis that will answer from the formulation of the problem and the purpose of this study that financial ratios can predict *financial distress* in Mining companies listed on the IDX. But of the four variables (financial ratios) used there is only one ratio that can predictconditions, *financial distress* namely ROA with a significant value of <0.05, can be seen in table 4.5 that the chi-square value is 38,575 with a significant value of 0,000. With a high significant value, the X2 variable has a clear difference between the two groups.

Based on the value of Canonical Correlation, it can be said that all the independent variables of *financial distress* (Y) obtained a value of 0.611 if squared (CR^2) to 0.373 or 37.3%. This value means that all independent variables (Current Ratio (X_1), Return On Assets (X_2), Total Asset Turn Over (X_3), Debt to Total Assets (X_4)) are used in the model together able to contribute as a differentiator in predictingconditions of *financial distress* a Mining company.

Return On Assets or variables (X_2) are selected variables as a differentiator of a company's condition, because it has the lowest significant value (<0.05) and the F-Ratio value is greater than one (49.497) so it can show the difference between financial conditions distress and non *financial distress*.

The ratio that measures the return on total assets or commonly called ROA which is used as a variable of this study explains that the greater the ratio, the greater the return on total assets and the better the financial condition of a company.

Of the 85 sample groups, there are 4 companies that are categorized as bankrupt, including Byan Resources Tbk (BYAN) in

2014 and 2015, Harum Energy Tbk (HRUM) in 2015, Perdana Karya Perkasa Tbk (PKPK) in 2014, 2015 and 2016, and the company Golden Eagle Energy Tbk (SMMT) in 2015. The four companies are companies that have a negative Z-Score discriminant function value (in appendix 6).

The results of this study support the research conducted by Reno Furqon (2013), Rosmadewi (2015) and Diana Mavianis (2017) which states that Return On Assets can predict *financial distress* in a company. In the research conducted by Rosmadewi (2015) which also uses discriminant analysis with the Z-Score states that the value of ROA based on the results of research has a high value. That is, ROA is the most dominant ratio to distinguish a company from bankruptcy and not bankruptcy. Thus the hypothesis in this study which refers to previous studies can be accepted with significant results <0.05. While the research conducted by Luciana (2003), Age Astri (2010) and Ni Luh Made (2015) stated that other variables can predict *financial distress*.

Conclusion

From the results of the discussion in this study, conclusions can be drawn as follows:

1. Of the four variables used in this study Current Asset, Return On Assets, Total Asset Turn Over, Debt to Total Asset are not able to distinguish between companies classified as *financial distress* or not .
2. From the results of discriminant analysis, the dominant financial ratios in forming discriminant functions to predict *financial distress* in Mining companies in 2012-2016 are Return On Assets. With the following criteria:
   a. A company is said to be bankrupt, if the ROA coefficient is negative, meaning that if the ROA value gets bigger then it will reduce the value of the discriminant function.
   b. A company is said not to go bankrupt, if the ROA coefficient is positive, meaning that if the ROA value gets bigger then it will increase its discriminant function.
3. All Financial Ratios used are distinguishing between manufacturing companies in the mining sub-sector

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